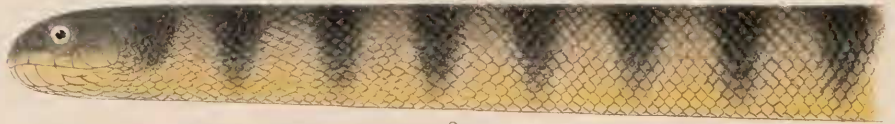
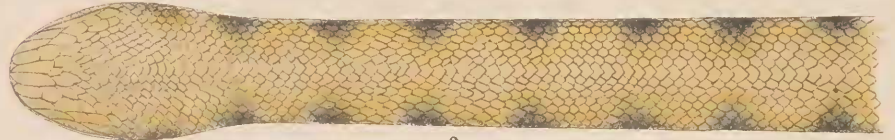




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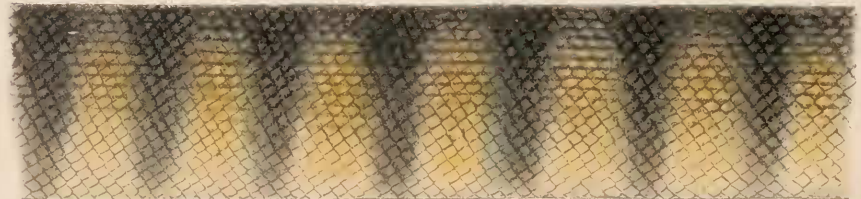
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T. Gerhardt del

J. Green, Chromo

THE COMMON INDIAN SNAKES. (Wall)

1-5. *Finhydrina valakadien*, *poisonous*. 6-8. *Hydrus platurus*, var. *bicolor*, *poisonous*.
all nat. size.

A POPULAR TREATISE ON THE COMMON INDIAN
SNAKES.

ILLUSTRATED BY COLOURED PLATE AND DIAGRAMS

BY

F. WALL, C.M.G., C.M.Z.S., F.L.S., LIEUT.-COLONEL, I.M.S.

Part XXVIII (with Plate XXVIII and Diagram.)

(Continued from page 437 of Volume XXVI.)

ENHYDRINA VALAKADYN (BOIE).

(vel SCHISTOSA (DAUDIN)).

THE JEW'S-NOSED SEASNAKE.

History.—The type-specimen, which had previously been lost sight of, I discovered in the Royal College of Surgeons' Museum, London. It is No. 523 of their catalogue (1859, p. 78), and is the original specimen from Tranquebar figured by Russell in his second volume (plate xi). It was one of Russell's collection which was presented to the above Institution by the East India Company, most of which has since been transferred to the British Museum.

I do not concur with Boulenger in thinking plate x. of Russell's same volume a distinct species. I agree with those herpetologists, and they are many, who think that the figure on plate x represents the same species as plate xi. If this opinion is correct this snake should be known by the name *schistosa* given it by Daudin in 1803, while Boie's name *valakadyn* dating from 1827 should be suppressed. I prefer in this paper however to retain the title with which all have been familiar for so many years.

Nomenclature. (a) *Scientific.*—The generic name is from the Greek "en" in, and "hudor" water. The specific name is borrowed from the vernacular.

(b) *English.*—I would suggest "Jew's nosed Seasnake" or simply "Jew's nose." These names draw attention to a very obvious feature which is peculiar to this species.

(c) *Vernacular.*—According to Russell "valakadyn" is the name given to it on the Coromandel Coast, and "hoogly pattee" about Calcutta. The former is Tamil from "valla" strong and "Kadyen" biter. "Pattee," a "bandage," obviously refers to its flattened body.

General characters.—The snake is robust in habit, the forebody cylindrical, and much less constricted relatively than in many seasnakes. Posteriorly the body is very compressed and heavy, especially in gravid females. The head is large, and has a peculiar

downward prolongation of the snout, and equally peculiar pronounced furrow in the chin. The tail is a flattened vertical paddle similar to that in other hydrophids.

Colour.—Very variable. The young are bluish or bluish-grey with many well defined, black annuli, often dilated vertebrally. As age advances these bands become more and more obscured, first disappearing ventrally, to become dorsal bars, which in old specimens may disappear altogether. In old adults the dorsum is frequently a uniform bluish or bluish-grey, merging at midcosta to yellow or yellowish ventrally. Both dorsal and ventral hues again are subject to much modification according to whether the specimen has recently desquamated or is about to do so. In the latter case the yellow on the belly becomes often tinged with brown.

Identification.—The downward projection of the rostral shield to below the level of the lip and the groove in the chin are both features peculiar to this species, and make identification as easy as it is certain.

The suture from the nostril passes to the 1st labial, a very unusual feature seen in only one other species, *viz.*, *Enhydria hardwicki*.

Habits.—This is far the commonest seasnake around our shores, and extraordinarily plentiful. On the Malabar Coast the fishermen brought them in bucketfuls until deterred from doing so. I have certainly had over fifty brought to me in one morning taken from their nets. On the Coromandel Coast at Madras and at Gopalpore I have seen the nets brought in with a dozen or more of these snakes among the haul. At Cannanore the men in the 75th Carnatic Infantry fishing in the sea with lines, more often it seemed to me hooked a "jew's nose" than a fish!

It frequently comes up tidal rivers, and several were captured for me at Watiya in Burma at a distance of 40 miles from the sea. It has been taken in Tolly's Nullah, Calcutta, 80 miles from the sea.

In Cannanore I kept several of these snakes in a dry masonry trough among my flower pots, where they lived many days without any water. Here they crawled about in a clumsy awkward fashion, but progression was far less hampered than is the case in the very thin necked seasnakes. All these specimens were conspicuously gentle creatures, that I failed to provoke to bite an offending object. This placid disposition is well exemplified by the fact that the sepoys and others who habitually bathed at Cannanore were never bitten, plentiful as I have shown that the "Jew's nose" is there.

The Sexes.—Females appear to be more numerous than males from the few notes at my disposal. In Cannanore of 13 specimens sexed 8 were ♀. Again of 19 fetuses obtained in the same station 12 proved to be ♀. Except for the basal swelling in the tail

in males there is nothing to distinguish the sexes. The tubercles on the scales are rather more pronounced in males than in females. Each male clasper is bifid with its extremities beset with villose papillæ. A raphé passes from the cloaca up the inner face, and then to the back of the "stalk" where it divides to pass up up each limb.

Food.—They live entirely on fishes. Speaking of Malayan specimens Dr. Annandale says: "A very large proportion of the fish on which they feed are silurids and others provided with long, sharp spines, and the manner in which these spines are eliminated from the snake's bodies is curious, for they appear to pass out through the walls of the alimentary canal and through the body wall to the exterior. I have frequently found specimens of the Hydrophiinæ with fish spines actually protruding from within through the integument, without, apparently, causing any inflammation or inconvenience. Seasnakes cannot hiss, but produce a low gurgling sound when annoyed."

Breeding.—The season is only proximately known. On the 12th November 1903, in Cannanore, I had a gravid ♀ in which small eggs were discovered containing no trace of embryo. In December the same year I had a gravid mother with foetuses, ranging from $6\frac{5}{8}$ to 7 inches long. In January and February 1904, I had four other gravid females in which the embryos were well developed, the most advanced measuring from $10\frac{3}{8}$ to 11 inches on January 29th. As Gunther has recorded a newly born individual $10\frac{1}{2}$ inches long, the brood above referred to would probably have been born early in February.

In 1917 I had 11 specimens from Madras in June (evidently this year's offspring) which varied in length from $12\frac{1}{2}$ to 17 inches. My youngest mother measured 3 feet 2 inches in January, a length I reckon (from rather meagre figures) she would have attained at the end of her 3rd year of life. My six gravid specimens contained respectively 4 foetuses, and 5 foetuses and 1 infertile egg, 6 eggs, 6 foetuses, 9 foetuses and 8 foetuses. The young latterly are contained in transparent membranous sacs filled with a viscid fluid of the consistency of castor oil. Males before birth as usual had their genitals extruded.

Growth.—The young appear to double their length in the first year, when they are about 20 to 24 inches long. At the end of the 2nd year they are about 30 inches long, and at the end of the 3rd about 38 to 40 inches, and growth continues for some years later. Average adult specimens range between 3 and 4 feet, but I have had larger examples, *viz.*, a ♀ 4 feet $3\frac{1}{2}$ with a girth of $6\frac{1}{2}$ inches at its greatest thickness, and a ♂ 4 feet 7 inches long.

Food.—I have only found fish ingested.

Venom of Enhydrina.

Quality.—In its dried state Fraser and Elliot report that it consists of “thin scales of a very pale yellow colour.”

Quantity.—Rogers estimated that the average amount injected during a bite represented one centigramme in the dried state. (Average from 13 specimens.) Fraser and Elliot’s estimate for six specimens is much lower, but could not be stated exactly owing to an accident.

Toxins.

- (1) Neurotoxins operating on nerve cells.
 - (a) A depressor paralysing the respiratory centre (Rogers, Fraser and Elliot).
 - (b) A depressor paralysing centres in the bulb (Inferred from the remarks of Rogers, Fraser and Elliot).
 - (c) A depressor paralysing nerve endings, the phrenics especially (Fraser and Elliot).
- (2) A direct stimulant to cardiae muscle (or nerve endings). Very feeble (Fraser and Elliot).
- (3) Toxins affecting the constitution of the blood.
 - (a) Hæmolysin. Very feeble (Fraser and Elliot).

Analysis of the action of Enhydrina toxin.

- (1) (a) The “neurotoxin” paralysing the respiratory centre is the chief agent in producing death. It is powerfully assisted by (1) (c).
- (b) This neurotoxin evokes symptoms of paralysis of the lips, tongue, throat and voice.
- (c) This assists (1) (a) in arresting breathing.
- (2) This is so feeble in action as to be altogether a negligible factor in the toxæmia.
- (3) (a) This affects the blood so little that hæmorrhages are not likely to be seen.

Symptoms of Enhydrina poisoning.

These have only been studied on lower animals in the laboratory. Rogers says there is no difference between the toxic manifestations of this species and the cobra.

Fraser and Elliot, however, have pointed out that there is much greater respiratory embarrassment with *Enhydrina* venom than cobra venom, and this is accounted for by the fact that in *Enhydrina* poisoning the heart and blood vessels are practically unaffected by any direct action of the venom, whereas in cobra toxæmia both are markedly affected. Again the paralysis of the end plates of the phrenic nerves is more pronounced than in cobra poisoning.

In the human subject then one would expect a clinical picture such as I have portrayed in my article on the cobra (Part XX of

these papers, Vol. 22, p. 243). Over and above this, one would expect a greater degree of respiratory embarrassment. Hæmorrhages are not so likely to occur and the local effects according to Lamb are slight. Death, as in other Colubrine toxæmiæ, is due to a paralysis of the respiratory centre.

Treatment.—Fraser and Elliot have shown that Calmette's antivenene has a very feeble action in neutralising the effects of the poison, so that this agent or the Kasauli preparation may be tried. Otherwise treatment should be symptomatic, and on the lines laid down in my book (Pois. Terr. : Snakes. 1913, p. 145).

Lethal dose.—The minimal lethal dose for rats was found to be .00009 grammes of dried venom per kilogramme weight of the rodent. In rabbits the dose was .00006 grammes and in cats, the least susceptible of the three animals experimented with, .0002 grammes.

Distribution.—Around all our coasts from the Persian Gulf to Tenasserim, the Malayan Region and as far East as New Guinea. At Cannanore though I have no figures to support me I judge that I got at least ten specimens for every one of all other species put together. In Madras in 1917, out of a collection of 199 seasnakes, 60 proved to be of this species. Though I have frequently witnessed the drawing in of the huge nets (perhaps a mile long) the fishermen use in Ceylon, I very rarely saw any seasnake captured, and never this species. I can find no record of it from the Andaman Islands though very common on the Coast of Burma.

Lepidosis.—*Rostral.*—Rather deeper than broad, projecting below the level of the lip. *Nasals.*—In contact behind the rostral; the suture from the nostril passes to the 1st labial. *Præfrontals.*—Usually touch the 2nd labial (in rare instances the præoculars meet the nasals). *Frontal.*—The parietal sutures are equal to the supraoculars or sometimes slightly longer. *Supraoculars.*—Usually as long and as broad as the frontal. *Præocular.*—One. *Postoculars.*—One or two. *Temporals.*—One, large, nearly descending to the lip, often divided into two. *Labials.*—7 to 8; the first 4 usually entire, the 3rd and 4th touching the eye. *Infralabials.*—5, the 5th in contact with 3 or 4 scales behind. *Marginals.*—None. *Sublinguals.*—Absent. Two small pairs both widely separated by small scales are regarded by some as such. *Costals.*—Two headlengths behind the head 47 to 61, at greatest girth 50 to 70: imbricate or subimbricate everywhere; furnished with keels occupying the median $\frac{1}{3}$ to $\frac{2}{5}$ of each scale, and frequently twice or thrice denticulated. The keels and their denticulations are most pronounced on the belly, especially in males which may be very rough in consequence. In females and young the keels are less obvious, or even obsolescent. This condition resembles very closely that seen in *H. cyanocinctus*, and *coronatus*. *Ventrals.*—230 to 361; little broader than the last costal rows; often divided; laterally keeled as in the last costal rows.

Dentition.—*Maxilla*.—Two fangs and 3 to 5 small teeth behind *Palatine*—5 to 6. *Pterygoid*—15 to 16. *Mandible*—16.

HYDRUS PLATURUS (LINNÉ).

LINNÉ'S SEASNAKE.

History.—Described by Linné in 1766. Figured by Russell in 1796 on the XLI plate of his 1st volume.

Nomenclature.—(a) *Scientific*.—The generic name is from the Greek “*udor*” water, the specific from the Greek “*platys*,” flat, and “*oura*,” tail.

(b) *English*.—Linné's seasnake.

(c) *Vernacular*.—According to Fayerer this snake is called “*kullundur*” by natives about Puri.

General characters.—It is the most eel-like of all the marine forms. The head is relatively large, and depressed, and the snout unusually long. The body anteriorly is not nearly so constricted as in many seasnakes, and is compressed. The back is sharply ridged. The tail is a vertical paddle as in other seasnakes.

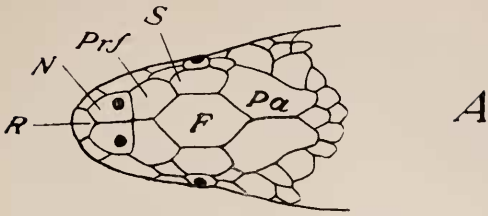
Identification.—The scale rows anteriorly (40 to 54) are unusually numerous for a marine species, and there are no marginals. Only one other species, *viz.*, *E. valakadyu*, agrees in these respects, and this is known by the downward projecting rostral, the groove in the chin, and the suture running from the nostril to the 1st labial, all features not seen in *H. platurus*. Osteologically it differs from the other marine species in that the præfrontal bones do not meet the parietal or postfrontals, and in the possession of a subparietal crest or keel. The snake, however, is very distinctively marked and once seen could hardly be mistaken for any other.

Colouration.—There are several colour varieties which may be grouped as follows.

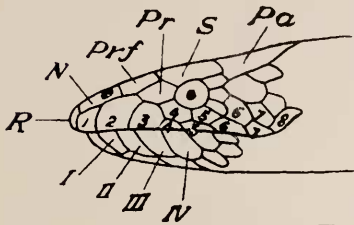
Variety (A) (= the *bicolor* of Schneider, and variety E of Boulenger's Catalogue, Vol. III, p. 268). Head chocolate or black above, yellow beneath. Body with a broad stripe dorsally of the same colour as the head. The lower edge of the stripe is straight, and sharply demarcated from the pale yellow of the sides and belly. Tail with black dorsal bars, and lateral spot.

This is by far the commonest variety on our coasts. Some specimens have a series of black costal spots in the yellow, or these may be confluent and form a more or less irregularly-outlined stripe. (Variety C of Boulenger's Catalogue.) Such specimens are not infrequent.

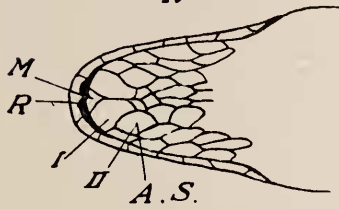
I have seen specimens in the Indian Museum from Ceylon and Puri. A specimen in the Bombay Natural History Society's collection from Madras, and another in the Indian Museum from the Nicobars, have the posterior part of the dorsal stripe festooned



A

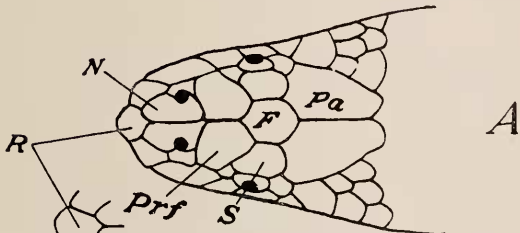


B

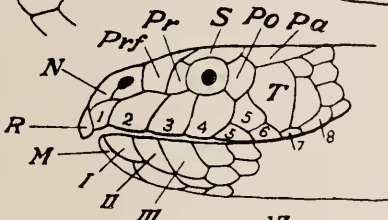


C

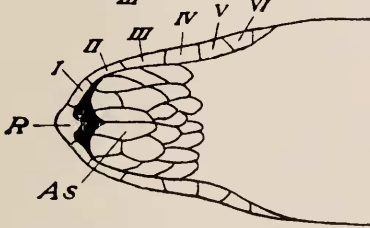
Hydrus platurus (Nat. size)



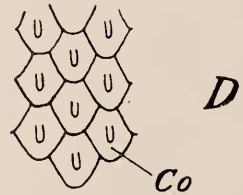
A



B



C



D

Enhydrina valakadyn
 A.B.C. nat. size D $\times \frac{2}{7}$
 COMMON INDIAN SNAKES.

instead of straight, and thus constitute a form transitional between Varieties A and B.

Variety (B) (= the *ornata* of Gray, the *maculata* of Jan, and Varieties A and B of Boulenger's Catalogue). In this the dorsal stripe is broken up into cross-bars in the whole body length, or for a variable extent posteriorly and a series of spots costally alternates with the bars. It is a rare form known from Borneo, but dubiously from our coasts.

Variety (D) (= Variety D of Boulenger's Catalogue). Like Variety A, but the yellow is replaced by a khaki hue. In some the hues are separated by a yellow line. I saw three such with a yellow line from Ceylon in the Colombo Museum, and there is one from Bombay in the British Museum. One without the yellow line in the Indian Museum is from Travancore, and there is another in the Colombo Museum from Ceylon.

Variety (E) (= Variety G of Boulenger's Catalogue). The name *pallidus* would suit this form. It differs only from Variety A in that the sides and belly are whitish or greyish, and the dorsal stripe and caudal marks are much paler than normal, indeed these may be almost obsolescent. Such a specimen from Travancore is in the British Museum. Probably a specimen I saw in the Colombo Museum from Ceylon, another in the Indian Museum from the Persian Gulf, and a third in the Bombay Natural History Society's collection from Bombay, all of which I took at first to be very faded specimens, belong to this variety. The last is so pale, and the vertebral stripe so extremely indistinct; I regarded it dubiously as an albino. Father Dreckman in 1913 wrote to me of a somewhat similar specimen he had recently acquired near Bandora on the Bombay coast. This was a light grey colour with a somewhat darker vertebral stripe. The tail had the usual characteristic black marks.

Breeding.—As far as I am aware no breeding events have been published, and I have never seen a gravid specimen myself. It is probably viviparous in habit like other sea snakes.

Poison.—In "Land and Water" (Nov. 15th, 1879) is an account of one that climbed up the anchor chain of a man-of-war in the Ganges. An unfortunate midshipman who tried to capture it was bitten and died shortly afterwards.

Ectozoa.—Both Dr. Annandale and Dr. Willey, among others, have remarked upon barnacles that attach themselves to this snake. Dr. Annandale mentions *Conchoderma hunteri* as one species, and Dr. Willey published an excellent plate of this snake with a cluster of Barnacles of two species, *viz.*, *C. hunteri* and *Lepas anserifera* clinging to the tail (Spolia Zeylanica, 1906, p. 207,

and 1910, p. 180). These creatures are not parasites, frequently clinging to inanimate objects. When attached to snakes they furnish an example of commensalism.

Length.—This is a small snake, specimens exceeding two feet being unusual. The largest measurement I know is 2 feet, $3\frac{1}{2}$ inches.

Lepidosis.—*Rostral.*—Broader than high. *Nasals.*—In contact behind the rostral. There is usually no suture from the nostrils, but when present it passes to the 2nd labial. *Præfrontals.*—Usually touch the 2nd labial, but sometimes they are cut off by the apposition of the præocular and nasal. *Frontal.*—The parietal sutures are equal to, or little longer than the supraocular. *Supraoculars.*—In length and breadth about three-quarters that of the frontal. *Præocular.*—One, rarely two. *Postoculars.*—Two, or sometimes three. *Temporals.*—Two or three small scales hardly deserving the name of temporals lie between the parietals and the 6th labial. *Labials.*—7 to 9; the first 3 usually entire, many of the succeeding frequently divided; the 4th, 5th, and 6th usually touching the eye. *Infralabials.*—5, the 5th largest, and touching 3 or 4 scales behind. *Marginals.* Absent. *Sublinguals.*—Small, but usually discernible as such; the fellows of both pairs separated by several scales. *Costals.*—Two headlengths behind the head 40 to 54, at greatest girth 41 to 55; juxtaposed everywhere. Each scale has a pair of small round tubercles in the middle, one behind the other, which are very characteristic. (A similar feature is only seen in two other seasnakes, *viz.*, *H. gracilis* and *H. cantoris*.) These tubercles are very pronounced in males, especially on the lowest costal rows, and give the snake a rough rasp-like feel. At or about midcosta the tubercles become single, and dorsally may be obsolescent, especially in females and young. *Ventrals.*—284 to 339; small, not or hardly broader than the last costal row, but usually recognisable as such, and countable; bituberculate laterally as in the lowest costal rows.

Distribution.—Persian Gulf to Tenasserim and the Andamans. Beyond Indian limits it has a very wide range extending to Japan, Australia, New Zealand, South Africa, and the Western Coast of North America.

Not uncommon on our shores. Ferguson speaking of Ceylon remarks that it is common about Colombo, and at the pearl fisheries.

Dentition.—*Maxilla.*—The upper jaw bears from 8 to 10 teeth behind the fangs. *Palatine* 6 to 7. *Pterygoid.* 23 to 27. *Mandibular* 16 to 18.

Plate.—Our figure shows a good illustration of Variety *bicolor* of Schneider.

(This series of Popular Articles is now concluded.)